Five years "Healthy Lower Rhine ... Against Stroke": implementation of a regional, intersectoral and sustainable public health program

Rau, Rüdiger; Rumpeltin, Carsten; Hoop, Renate; Pfeiffer, Holger; Drees, Jeannette; Paas, Birgit; Schmitz-Buhl, Gabriele; Geraedts, Max

J Public Health (2010) 18:29–34
DOI 10.1007/s10389-009-0278-1

ORIGINAL ARTICLE

Five years "Healthy Lower Rhine…Against Stroke": implementation of a regional, intersectoral and sustainable public health program

Rüdiger Rau · Carsten Rumpeltin · Renate Hoop · Holger Pfeiffer · Jeannette Drees · Birgit Paas · Gabriele Schmitz-Buhl · Max Geraedts

Received: 12 December 2008 / Accepted: 4 May 2009 / Published online: 15 August 2009

Abstract
Aim Stroke is one of the leading causes of death worldwide. Optimizing health care according to the "time is brain" concept is recommended by the Local Health Conferences (KGK) in North Rhine-Westphalia. In 2001, KGK managers from six neighboring districts and municipalities founded the "Healthy Lower Rhine Network." In 2003 the network launched the program "Healthy Lower Rhine…Against Stroke." This initiative aims primarily at reducing pre-hospital time, i.e., delays from onset of symptoms to hospital presentation in order to optimize modern acute health care. Improving community knowledge of stroke is crucial in this context as well as training in the professional sector.

Methods The conceptual framework comprised three elements: (1) needs assessment, using local expert panels, surveys into community knowledge and clinic data samples of health care quality; (2) intervention plan containing a social marketing concept with two-level organization and standards, training and education in health care; (3) formative and summative evaluation. Central elements of the intervention plan are: local health targets, collaboration and networking, intersectorality, continuity and sustainability (5-year runtime), corporate design, target groups and settings.
Results The central elements of the concepts were implemented. Community surveys revealed similar deficits in public knowledge on stroke in the city of Düsseldorf (2000 and 2004) and in the Wesel district (2002 and 2008). Knowledge of proper action (phone 112 in case of a stroke) significantly improved in Düsseldorf's community with 32.5% correct statements in 2000 versus 50.6% correct answers in 2004 and, finally, 69% correct answers in 2008 in the Wesel district. Clinics in the Wesel district collected 3-month samples of data on pre-hospital times in 2003 before the start of the initiative and in 2005. There was no significant change, with a constant portion of 28% of patients being hospitalized within a 3-h window after onset of stroke symptoms.
Conclusion Due to medical progress and demographic changes, stroke remains a paramount issue in Public Health in Germany. The "Healthy Lower Rhine Network" uses its program "Healthy Lower Rhine...Against Stroke" to present a strategy to launch and implement a complex, sustainable and intersectoral Public Health intervention, in spite of a growing shortage of resources in public health services.

Keywords Optimizing stroke care · Public health program · Networking of local public health services · Health conferences · Evaluation · Sustainability

R. Rau (✉)
Public Health Department,
Muehlenstr. 9–11,
47441 Moers, District of Wesel, Germany
e-mail: ruediger.rau@kreis-wesel.de

C. Rumpeltin
Public Health Department,
Neuss, Rhine-district, Germany

R. Hoop · H. Pfeiffer
Public Health Department,
Düsseldorf, North Rhine-Westphalia, Germany

J. Drees · B. Paas
Public Health Department,
Krefeld, Germany

G. Schmitz-Buhl
Public Health Department,
Mönchengladbach, Germany

M. Geraedts
Public Health course of studies, Heinrich Heine University,
Düsseldorf, Germany

Background

Stroke is one of the leading causes of death worldwide and in Europe; it represents the most important cause of life-long handicaps in adults, with consequences ranging from limited ability to run a household and inability to work, to requiring total care (European Stroke Organization 2008). During the last decades significant progress has been made in stroke treatment, diagnosis and rehabilitation with improved outcomes in patients (Wardlaw et al. 2004). An important prerequisite for an optimal acute treatment, however, is a timely presentation of patients to hospitals, especially in specialized wards, so-called "stroke units" (Sandercock et al. 2002, Busch & Diener 2003, ESO 2008). Thus, raising public awareness about strokes is a crucial first step in optimizing health-care quality for strokes (Schneider et al. 2003). At the same time, health-care quality needs to be developed—both on process and structural levels (ESO 2008).

Local Health Conferences (KGK, Kommunale Gesundheitskonferenzen) in North Rhine-Westphalia are designed to optimize medical and social health care (Brand et al. 2003; Murza et al. 2005).

Given the general lack of resources in the public services on the one hand and the diversity of possible spheres of activity on the other, one core question for the heads of the KGK centers arises: How can complex, intersectoral and sustainable prevention programs in the sense of the Ottawa Charter of the World Health Organization (WHO 1999) be implemented in times of scarce personnel and financial resources in the ÖGD (*Öffentlicher Gesundheitsdienst*, Public Health Service)? On the basis of this consideration, the KGK centers founded the "Healthy Lower Rhine Network" in 2001 in six neighboring districts and municipalities: the cities of Düsseldorf, Krefeld and Mönchengladbach, and the districts of Neuss, Viersen and Wesel took part. In 2003 the network launched the program "Healthy Lower Rhine…Against Stroke." This initiative aims primarily at reducing pre-hospital time, i.e., delays from onset of symptoms to arriving at the hospital.

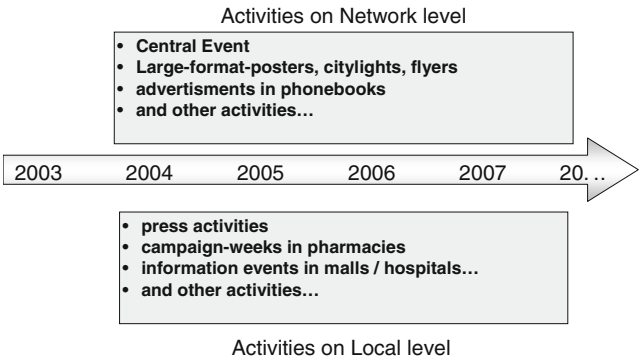

Fig. 1 Two-level model for implementation of the "Healthy Lower Rhine...against Stroke" program

Aims

The strategic objective of the Public Health program "Healthy Lower Rhine…Against Stroke" is to optimize health-care delivery and outcome in stroke patients. Quick admission and in-patient treatment are important prerequisites for improved outcomes for people afflicted by stroke. The operational goals of the program defined prior to the start of the stroke campaign are:

1. Improved public knowledge of the symptoms,
2. Improved public knowledge of proper action (motto: stroke = emergency = phone emergency number 112!),
3. Significantly reduced pre-hospital time.

Methods

Network Healthy Lower Rhine

The aim of this network is to deal with matters of common interest for the improvement of health care as well as prevention. Using closer intercommunal collaboration in the public health service, resources are to be pooled and the effects of synergy utilized to jointly implement a public health program that individual districts and municipalities would not be able to realize on their own. The horizontal networking is intended to expand the geographic reach of the intervention with rural areas and cities. A total of around 2.3 million people live in the region "Healthy Lower Rhine." Three self-administered cities—Düsseldorf, Krefeld and Mönchengladbach—and three districts—Wesel, Viersen and Rhine-district Neuss—participate in the network program. The risks of larger measures for the individual network partners, such as production and coordination costs, can also be minimized in this manner.

Conceptual framework of the program

The concept comprises three elements: (1) needs assessment, (2) intervention and (3) evaluation.

(Element 1) Needs assessment is based on panels of experts in the districts and municipalities, representative telephone surveys of the community in Düsseldorf (2000) and the Wesel district (2002) (Pfeiffer et al. 2006; Rau et al. 2006), and analysis of current in-patient care in the Wesel district as a reference region in 2003 (Rau et al. 2008).

(Element 2) The intervention consists of a social marketing campaign (i.e., communication of stroke symptoms and the message: Stroke is an emergency, call 112) with a two-level implementation strategy (see Fig. 1) and standardization and training in the professional sector, especially for the emergency medical services staff.

Social marketing is based on three cornerstones of the communication strategy: mass media, interpersonal communication and a centralized telephone hotline (Naidoo & Wills 2003, Pott et al. 2003).

Public health programs represent an important method for promoting health; sustainability or longevity is particularly important for these programs and has become the subject of scientific consideration only in the last few years (Puska and Vartiainen 1999, Pluye et al. 2004). For this reason, a runtime of 5 years was determined before the start of the program.

Members of Local Health Conferences and their cooperation partners use routine channels for distributing information materials. Some of these channels are, for instance, hospitals, panel doctors' practices, pharmacies, welfare organizations, self-help groups, pharmaceutical associations, regional management of medical insurance, retail and trade associations and others. A two-level model played a central role in terms of the implementation. For reasons of practicability in a complex project, an organizational split between the network level and the local level was established (Fig. 1).

(Element 3) Evaluation comprises a formative and a summative approach (Øvretveit 2002). Formative evaluation was carried out during regular meetings of the network partners, with at least one meeting per quarter. Summative evaluation was based on, firstly, community stroke knowledge, as revealed by comparable phone surveys in Düsseldorf (2004) and the Wesel district (2008). Secondly, clinical data from all eight hospitals in the Wesel district were analyzed in the years 2003 and 2005.

Results

Needs assessment

Local panels of experts

Expert working groups in all network municipalities were commissioned by health conferences to examine the quality of stroke health care. After comprehensive analysis, the specialist working groups saw a need for action and optimization in different areas of stroke care, and recommendations for activity were put forward:

(a) Implementation of an information campaign about stroke,
(b) Introduction of standards in health care for strokes in the pre-in-patient and in-patient areas
(c) Reinforcement of medical rehabilitation of stroke patients (Rau 2004).

These recommendations were unanimous decisions of the expert group. The recommendations were reported to the health conference, which in turn deliberated on and finally approved them. The implementation of the recommended measures and activities is based on voluntary self-commitment of all participants involved.

Surveys on community knowledge about stroke

In the Wesel district a total of 1,089 people were interviewed in 2003, of which 31.9% knew none of the symptoms, 25.7% could name one symptom, 23.8% two symptoms and 18.6% three or more correct signs. Weakness/paralysis was named most frequently by 43.6% of the respondents.

As shown in Table 1, the extent of lack of knowledge in urban areas (Düsseldorf) is similar to that in more rural areas (District of Wesel) (Rau et al. 2006).

Data on quality of stroke care in clinics

In 2002, the specialist working group on the topic of "Stroke Care in the Wesel District" agreed to conduct research on health-care provision at local clinics. In the first instance, the goal was to obtain undistorted primary data as far as possible, and secondly to enable progress monitoring of the health-care situation in the course of the intervention. The results are described below (see "Summative evaluation") (Rau et al. 2008).

Social marketing

The following common regional project elements were developed and implemented on the central level:

1. Corporate design: Using a network logo and a uniform design of the information material was the basis for a corporate design of the project.
2. Mass media: In addition to special pages in the telephone directory "*Das Örtliche*," large-format posters and city-light poster campaigns, and the distribution of flyers and posters, stickers for emergency vehicles were used as mass media measures.
3. Public relations activities: It was also possible to convince prominent and popular people, such as Ewald Lienen, Friedhelm Funkel and Isabell Werth, to provide interviews and agree to photo shoots in support of the public relations articles and reader telephone campaigns by local newspapers.
4. Central events: Once a year a central event was held in one of the network districts and municipalities.

Table 1 Number and type of correct symptoms mentioned in two surveys (row %), multiple responses in "type of symptom"

Number of symptoms mentioned	Wesel District (2002)**	Düsseldorf (2000)*
0	31.9	35.8
1	25.7	25.5
2	23.8	23.9
≥3	18.6	14.8
Type of symptom		
Weakness/ paralysis	43.6	40.9
Numbness	1.4	-
Difficulty speaking	22.2	19.4
Vertigo/gait disturbance	21.9	17.5
Unconsciousness	14.0	6.3
Impaired consciousness	13.4	11.9
Headache	10.9	9.8
Impaired vision	9.7	16.7

Source: *Telephone survey 2000 commissioned by the Düsseldorf Department of Health (n=1,062)

**Telephone survey 2002 commissioned by the Wesel district Public Health Department (n=1,089)

Training in the professional sector

Standards in health care were introduced, and training was carried out for emergency medical services (EMS), nursing staff and doctors in the years 2003 and 2004.

Evaluation

Formative evaluation

The evaluation of process quality within the project or its sub-projects is carried out primarily by the members of the "Healthy Lower Rhine Network." For this purpose, persons responsible for the sub-projects were selected by mutual agreement. Their responsibility lies in coordinating and ensuring structured, goal-oriented implementation of their particular project area. The output is collected at regular intervals—approximately every 6 weeks—and evaluated in plenary sessions.

Summative evaluation

Public surveys

Public surveys for evaluation purposes were performed in the Wesel district (2002, 2008) and the city of Düsseldorf (2000, 2004), as representative of the entire network.

The knowledge of proper action (emergency phone number 112 in the event of a stroke) improved significantly in Düsseldorf, from 32.5% (Survey 2000) to 50.6% correct answers (2004), and in spring 2008 no fewer than 69% of respondents in the District of Wesel gave the correct answer (see Table 2).

While in 2002 a proportion of 31.9% of the interviewed persons in the Wesel district did not know a single correct stroke symptom, in 2008 this portion decreased to 27.3%. Three or more correct signs were mentioned by 18.6% in the t_0 survey versus 25.5% in 2008 (t_1 survey). Symptoms that were mentioned significantly more frequently in 2008 than in 2002 were: hemiplegia respectively dropping the corner of the mouth (+5.3%), numbness/paraesthesia (+17.9%), trouble speaking or understanding (+6.1%) and trouble seeing/visual impairment (+4.3%).

Evaluation of the stroke campaign in clinics in Wesel district

Prior to the start of the campaign, seven clinics documented 326 patients that had been admitted to in-patient care with symptoms of an acute stroke. After the campaign had been running for 2 years, all eight clinics in the district participated, documenting 375 patients. One general hospital, six hospitals offering secondary health care and "maximum medical care"-level house took part. There were two departments of neurology, five of internal medicine and one of geriatrics involved.

The percentage of patients who arrived at the hospital within 3 h of the start of symptoms was identical at the point in time of recording the data (27.5% T_0; 27.3% T_1). In 2005, initial treatment occurred more often in the emergency unit of the hospital (32% T_0; 84% T_1) (Rau et al. 2008).

Interim evaluation and new conception

Innovative approaches for addressing the public in 2006–2007 in the Wesel district In response to the evaluation results from clinical data, the Public Health Department of the District of Wesel developed a series of innovative approaches for addressing the public, which were implemented in 2006/2007.

Firstly, motor vehicle registration/admission offices in the cities of Wesel and Moers were asked to hand out the

Table 2 Survey results of knowledge of proper action in Düsseldorf 2000 and 2004 and the Wesel district 2008

"Whom would you phone if you suddenly noticed symptoms of a stroke in yourself?"

Answer category	Data for 2000 *	Data for 2004 *	Data for 2008**
Relative, neighbor	20%	13.9%	12.2%
Family doctor	37.4%	25.9%	12.4%
112: Emergency doctor, fire department, emergency services	32.5%	50.6%	69%
Hospital	7.6%	5.4%	4.1%

Source: *Telephone survey 2000/2004 commissioned by the Düsseldorf Department of Health (n=1,062/1,018)

**Telephone survey commissioned by the Wesel district, Public Health Department (n=1,104)

folder "Stroke...A medical emergency" to every citizen getting in touch with the office.

Secondly, the professional hairdressers worked as "personal communicators": while styling the hair of their clients, they asked questions about stroke (warning signs, risk factors, proper action in case of acute stroke). Hairdressers read those items to the clients that they had not mentioned. Thirdly, in November 2006 all companies with more than 50 employees were asked to distribute folders in both German and Turkish to their personnel. By carrying out the above-mentioned projects, it was possible to distribute about 100,000 folders to citizens in a personal and obliging manner. Assuming that each folder was being read by at least one further person, about 200,000 citizens were supplied with stroke information (Leifeld and Rau 2008).

Discussion

What is new and special about the Public Health program presented here? It is not only an example of local public health practice in which the public health service plays a stable, central role as initiator and coordinator in the area of stroke health care; other federal projects have had relatively short running times or were coordinated by other players in the health system, like university hospitals in, for example, the cities of Essen or Cologne (Busch & Diener 2003).

Besides this new form of intercommunal collaboration, the work at hand also presents a model for managing a complex and comprehensive project. From the point of view of the authors, it proved to be very useful in terms of organization to split the measures across two levels—one central and collective, the other decentral and local.

The clinical data on local health care quality show that the main aim of reducing pre-hospital time could not be reached after 2 years of the project. When comparing the data from T_0 and T_1 from clinics in the Wesel district, 28% of patients were admitted to a clinic within 3 h. Was the campaign not effective? In the first instance, it can be seen that the quota in the Wesel district corresponds to the national level, based on the results of the German Stroke Registers Study Group, ADSR (Heuschmann et al. 2003). Furthermore, it should be borne in mind that population-based prevention programs in most cases only produce measurable health results after a period of 3 to 10 years (Pluye et al. 2004). On the other hand, there was evidence that the quality of clinical care process had improved: In 2005 initial treatment was far more frequently provided in the emergency unit of hospitals than in 2003 (32%=T_0 versus 84%=T_1).

Finally, it has to be considered that pre-hospital delay is influenced by several factors besides awareness of stroke signs in the community and proper performance of patients. However, the time from symptom onset to calling medical help "…is the predominant part of pre-hospital delay" (ESO 2008). This fact may serve as a rationale to continue efforts of raising public awareness about stroke information and the emergency number 112.

Conclusion

On an organizational level, the network and project structure presented here provide an opportunity for implementing a sustainable, intersectoral and large-scale public health program on a local level in North Rhein-Westphalia, Germany, despite varying amounts of professional and financial resources.

The program provides a framework—a kind of "golden thread"—that can be filled in with individual local measures, depending on the options and resources available to the individual players.

Federalism, fragmentation in health-care delivery and administration are partially opposed to a uniform, comprehensive formulation and implementation of health targets in a larger region. However, the approach presented here, namely the formation of a network of local public health services, could provide an example for implementing sustainable and intersectoral public health programs of significant regional impact.

Acknowledgement Thank you to all colleagues in the "Healthy Lower Rhine Network," Ilona Hartmann (City of Düsseldorf), Nicole Savelsberg (District of Düren), Berthold Seibel (City of Mönchengladbach), as well as Dr. Thomas Leifeld (District of Wesel).

Thank you also to the Institute of Health and Work NRW (LIGA), Bielefeld, as well as to the Institute for Quality in Public Health for North Rhine (IQN), Düsseldorf.

Conflict of Interest The authors confirm that there are no relevant associations that might pose a conflict of interest.

References

Brand H, Schmacke N, Brand A et al (2003) Der öffentliche Gesundheitsdienst—Zukünftige Aufgabenbereiche des öffentlichen Gesundheitsdienstes. In: Schwartz FW (ed) Public Health—Gesundheit und Gesundheitswesen. Hrsg. Urban und Fischer, München, Jena, pp 367–375

Busch E, Diener H-C (2003) Schlaganfallversorgung: Mit Netzwerken auf innovativen Wegen. Deutsches Ärzteblatt 100; Nr 40:A2567–A2569

European Stroke Organization—ESO (2008) Guidelines for Management of Ischaemic Stroke and Transient Ischaemic Attack. Cerebrovasc Dis 25:457–507

Heuschmann PU, Berger K, Misselwitz B, Hermanek P, Leffmann C, Adelmann M, Buecker-Nott HJ, Rother J, Neundoerfer B, Kolominsky-Rabas PL, for the German Stroke Registers Study Group and for the Competence Net Stroke (2003) Frequency of Thrombolytic Therapy in Patients With Acute Ischemic Stroke and the Risk of In-Hospital Mortality. Stroke 34:1106

Leifeld T, Rau R (2008) Schlaganfallprävention Neue Ansätze der Bevölkerungs-ansprache durch den öffentlichen Gesundheitsdienst (Stroke prevention—New approaches to addressing the community by the public health office). Prävention und Gesundheitsförderung. Heidelberg 2:75–80

Murza G, Werse W, Brand H (2005) Ortsnahe Koordinierung der gesundheitlichen Versorgung in Nordrhein-Westfalen. Bundesgesundheitsbl-Gesundheitsforsch-Gesundheitsschutz 2005–48:1162–1169

Naidoo J, Wills J (2003) Lehrbuch der Gesundheitsförderung. Hg.: Bundeszentrale für gesundheitliche Aufklärung (BzgA), Köln

Øvretveit J (2002) Evaluation gesundheitsbezogener interventionen. Huber, Bern Göttingen, Toronto, pp 56–62

Pfeiffer H, Rau R, Mensing M, Schneitler H, Brand H (2006) Schlaganfall-Prävention: Identifizierung von Präventionspotenzialen durch Bevölkerungssurveys. Präv Gesundheitsf 1:99–107

Pluye P, Potvin L, Denis JL (2004) Making public health programs last: conceptualizing sustainability. Evaluation and Program Planning 27:121–133

Pott E et al (2003) Strategien des sozialen marketing. In: Schwartz FW (ed) Public health—Gesundheit und Gesundheitswesen. Hrsg. Urban und Fischer, München, Jena, pp 215–229

Puska P, Vartiainen E (1999) Political Challenges 3 - Heart Disease. In: The Evidence of Health Promotion Effectiveness—Shaping Public Health in a New Europe. A Report for the European Commission by the international Union for Health Promotion and Education. ECSC-EC-EAEC, Brussels-Luxembourg, 55–68

Rau R (2004) Koordinierung der sozialen und gesundheitlichen Versorgung: Themenschwerpunkt: Schlaganfall-Versorgung im Kreis Wesel. In: Die Landrätin, Hrsg. Gesundheitsbericht Kreis Wesel, pp. 128–136

Rau R, Mensing M, Brand H (2006) Schlaganfall-Wissen der Bevölkerung: Survey im Kreis Wesel (2002). Bundesgesundheitsbl-Gesundheitsforsch-Gesundheitsschutz 49:450–458

Rau R, Otten K, Genz J, Geraedts M (2008) Evaluation des Public Health-Programms "Gesunder Niederrhein...gegen den Schlaganfall" durch Primärdaten aus Kliniken im Kreis Wesel-Vergleichende Studie von Stichprobendaten aus den Jahren 2003 und 2005. Medizinische Klinik 103:20–28

Sandercock P, Berge E, Dennis M, Forbes J, Hand P, Kwan J et al (2002) A systematic review of the effectiveness, cost-effectiveness and barriers to implementation of thrombolytic and neuroprotective therapy for acute ischaemic stroke in the NHS. Health Technol Assess 6(26):38–52

Schneider TA et al (2003) Trends in community knowledge of the warning signs and risk factors of stroke. J Am Med Assoc 289 (3):343–346

Wardlaw JM, del Zoppo G, Yamaguchi T, Berge E (2004) Thrombolysis for acute ischaemic stroke (Cochrane Review). In: The Cochrane Library, Issue 1, Chichester, UK: John Wiley & Sons, Ltd., S 23–34

WHO Regionalbüro für Europa (1999) Gesundheit 21. Das Rahmenkonzept "Gesundheit für alle" für die Europäische Region der WHO. Europäische Schriftenreihe "Gesundheit für alle" 6, Weltgesundheitsorganisation